NOAA's National Weather Service Kansas City/Pleasant Hill, Missouri

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Threatening Skies

"Working together to save lives."

Annual Severe Weather Awareness Week set for March 13–17, 2006

The National Weather Service, the Kansas Division of Emergency Management, and the Missouri State Emergency Management Agency have announced the annual Severe Weather Awareness week will be held **March 13 - 17, 2006.**

An area-wide tornado preparedness drill from the Pleasant Hill NWS office will be conducted at **1:30 p.m. on March 14.** Should the weather be threatening on March 14, the drill will be postponed until Thursday, March 16.

Local warning sirens, NOAA Weather Radio, and the Emergency Alert System will be activated to signal the start of the drill. Area residents should treat the drill as if it were an actual tornado emergency.

The purpose of the annual drill is to test everyone's readiness for life-threatening severe weather events such as tornadoes, flash floods, large hail, damaging winds, and lightning.

Area residents and emergency management are encouraged to use Severe Weather Awareness Week as their springboard into preparing for the 2006 severe weather season. Daily themes during this week include:

Monday (2005 review)

Tuesday (Tornadoes)

Wednesday (Flash Floods)

Thursday (Lightning)

Friday (Hail and Wind).

More information about Severe Weather Awareness Week, along with awareness materials in electronic form, can be found on the web at: www.weather.gov/kc. ◆

By Mike Hudson, Warning Coordination Meteorologist

"Quiet" yet busy in 2005

After record tornado years in 2003 and 2004, the 2005 season seemed quiet in comparison. Actually, the 2005 severe weather season went down on record as being a little busier than normal.

A total of 13 tornadoes touched down in 2005 within the Pleasant Hill service area. This total is just above the 50 year average of around 11 tornadoes.

The state of Missouri recorded 31 tornadoes. An average year brings 26 tornadoes to Missouri. In Kansas, a state record of

(Continued on page 2…)

WHAT'S HOT?

- March 14: statewide tornado drills to be held at 1:30 p.m. (alternate weather date is March 16).
- "Quiet" yet busy severe weather year in 2005.
- 1" hail experiment extended to 2006.
- Polygon warning initiative continues.
- National Flood Awareness Week March 20-24.
- Lightning Kills: Play it Safe!

Inside this issue:

"Quiet" yet active severe weather season in 2005

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135 tornadoes was set in 2005. This broke the previous record of 122 set just one year ago! Only three of these 135 tornadoes affected far eastern Kansas, two of which affected Atchison and Leavenworth Counties on April 21.

The busiest tornado day across the local region was June 4, with eight tornadoes. The first two tornadoes that struck on June 4 occurred right around sunrise in Johnson County, Missouri. One of these tornadoes reached F1 intensity, and produced just over $1 million in damage to the Miller's Horse Farm south of Holden. Two residents were also injured by this tornado. Seven other tornadoes struck in far northwestern Missouri. The strongest of these tornadoes also reached F1 strength, as it carved a path of destruction through Worth County. Other notable events during 2005 include:

- Wind damage east of Maryville on March 30.
- An 80 to 90 mph squall line that struck the southeast portions of the Kansas City metro area on June 8.
- A microburst near Pickering in Nodaway County on July 21.
- An F0 tornado near Boonville on August 13.
- An F1 tornado that hit from Excelsior Springs to Lawson on November 27. This tornado was the second latest on record in a calendar year to strike in the Kansas City metro area. ◆

Tornado damage In Worth County June 4, 2005

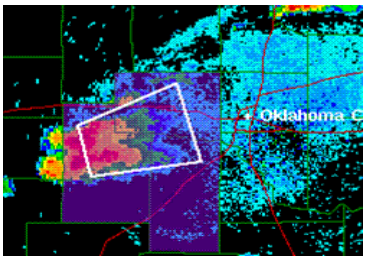
Polygon warning and 1" hail initiatives continue in 2006

By Mike Hudson, Warning Coordination Meteorologist

In 2005, the National Weather Service office in Pleasant Hill experimented with two new service initiatives for severe weather warnings. Based on user feedback, both of these initiatives will continue into the 2006 season.

The first initiative, **Polygon Warnings**, will continue to allow emergency management, the public and the media to truly "see" the areas identified as being at the greatest risk from severe weather.

Polygons used to denote this risk area are defined as a set of four or more latitude and longitude points that can be displayed graphically. These coordinates can be found at the bottom of an NWS warning text message, denoted by the "LAT...LON" label. The polygon represents the area of maximum threat within the warned area.



Issuing warnings by polygon gives the warning message many new advantages. The graphical depiction of the Polygon allows users to truly see the specific threat area. The Polygon approach also allows the warning team to reduce the area needlessly warned within a county (example: note the smaller warning area within the Polygon example above as opposed to the larger warning area for all three counties.

The 1**" hail initiative** will also continue in 2006. Severe Thunderstorm Warnings will be issued for hail that is expected to be at least one inch or greater in diameter. The definition of a severe thunderstorm remains unchanged, as a storm that produces three-quarter inch diameter or larger hail.

The NWS in Pleasant Hill will experiment again with the larger hail criteria in the 2006 season, to see if the larger criteria makes the severe thunderstorm warning more effective in communicating the threat to life or property. The change in 2005 led to a **32% reduction** in the number of severe thunderstorm warnings that would have been issued . ◆

Threatening Skies

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2005 Kansas and Missouri Tornado Facts

Kansas

Tornadoes: 135 (80 above normal)
Deaths: Zero **Injuries:** Zero
Strongest: F3 (Neosho County 4/21, Trego County 6/9)
Most in a county: 16 (Trego)
Days of tornado occurrence: 23
Most in one day: 25 (June 4)
Most in a month: 49 (June)
First tornado of the year: 3/21 (Comanche County)
Last tornado of the year: 11/27 (Allen County)

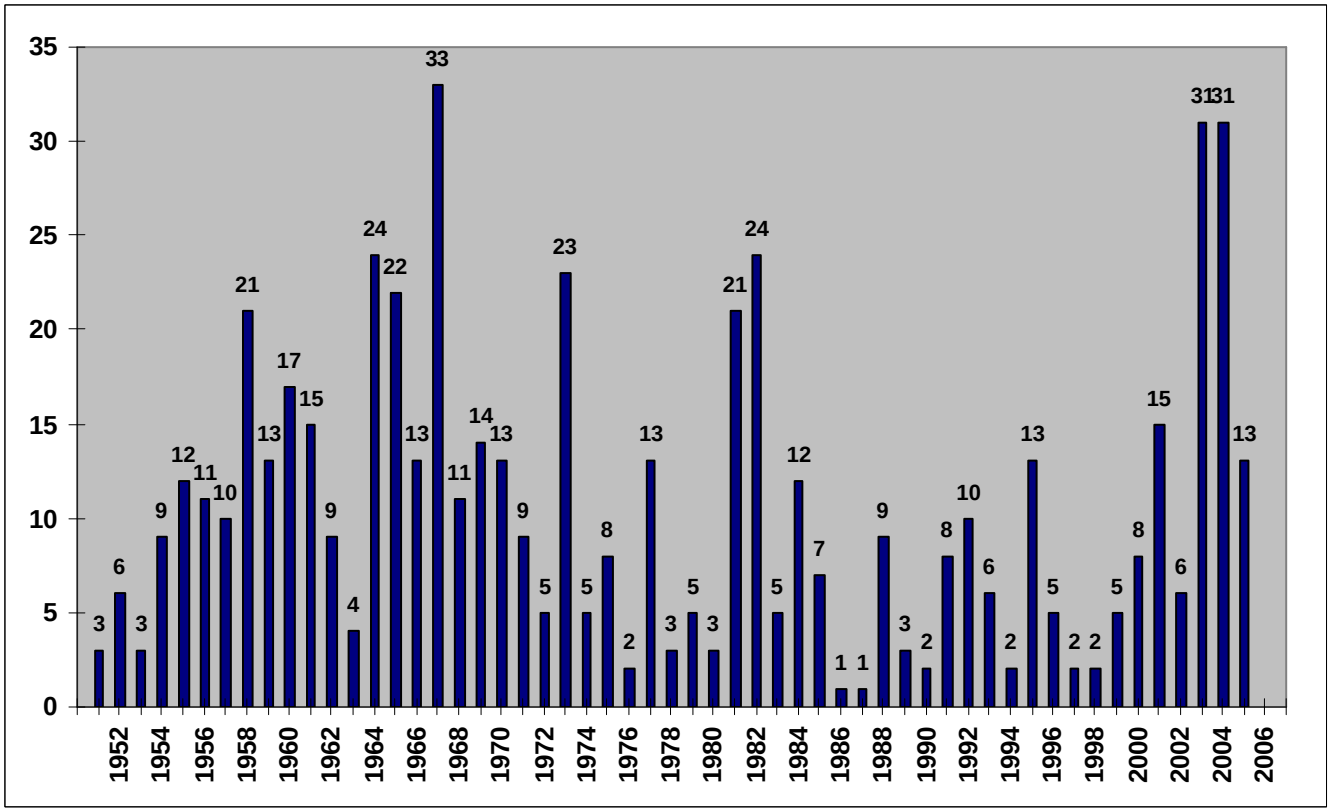
Missouri

Tornadoes: 31 (5 above normal)
Deaths: 1 **Injuries:** 7
Strongest: F2 (Oregon/Ripley Co. 11/5, Ripley Co. 11/27)
Most in a county: 3 (Gentry, Newton, Howell)
Days of tornado occurrence: 11
Most in one day: 8 (June 4)
Most in a month: 12 (June, November)
First tornado of the year: 1/12 (Ozark County)
Last tornado of the year: 11/27 (multiple locations)

NWS Pleasant Hill County Warning Area

Tornadoes: 13 (2 above normal - 11 F0, 2 F1)
Deaths: Zero **Injuries:** 2 (Holden on June 4) **Damage:** $2.6 million
First tornado of the year: April 21 (Atchison County, KS)
Last tornado of the year: November 27 (Clay/Ray Counties)

Pleasant Hill County Warning Area Tornado Totals—1951 through 2005



Introducing the Enhanced Fujita Scale

By Mike Hudson, Warning Coordination Meteorologist

Comparing the scales

	F-Scale Winds *	EF-Scale Winds *
0	40-72	65-85
1	73-112	86-110
2	113-157	111-135
3	158-207	136-165
4	208-260	166-200
5	261-318	> 200

- F-Scale winds use the fastest 1/4 mile wind speed.
- EF-Scale winds use the fastest 3-second gust.

NOAA's National Weather Service announced plans this spring to implement the Enhanced Fujita (EF) Scale in February 2007. The EF scale, used to rate tornado intensity, will replace the original Fujita (F) Scale. The EF Scale will continue to rate tornadoes on a scale from zero to five, but ranges in wind speed will be more accurate with the improved rating scale.

"The EF Scale takes into account additional variables which will provide a more accurate indication of tornado strength," said retired Air Force Brig. Gen. David L. Johnson, director of NOAA's National Weather Service. "The EF Scale will provide more detailed guidelines that will allow the National Weather Service to more accurately rate tornadoes that strike in the United States."

The F Scale was developed in 1971 by Dr. T. Theodore Fujita, to rate tornadoes and estimate associated wind speed based on the damage they cause. The EF Scale refines and improves the original scale.

The new scale was developed by the Texas Tech University Wind Science and Engineering (WISE) Research Center, along with a forum of wind engineers, universities, private companies private meteorologists and government organizations including NOAA meteorologists from across the country.

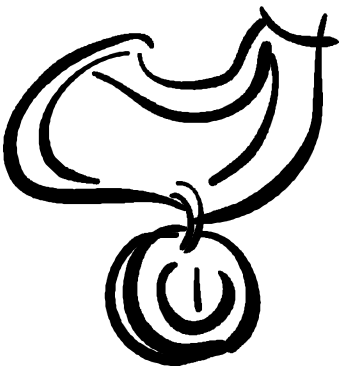
Limitations of the original F Scale may have led to inconsistent ratings, including possible overestimates of associated wind speeds. The EF Scale incorporates more damage indicators and degrees of damage than the original F Scale, allowing more detailed analysis and better correlation between damage and wind speed.

The original F Scale historical data base will not change. An F5 tornado rated years ago is still an F5, but the wind speed associated with the tornado may have been somewhat less than previously estimated. A correlation between the original F Scale and the EF Scale has been developed. This makes it possible to express ratings in terms of one scale to the other, preserving the historical database.

For more information on the EF scale, check out:

http://www.spc.noaa.gov/efscale ◆

NWS Pleasant Hill awarded DOC Silver Medal



The U.S. Department of Commerce recently awarded its 2005 Silver Medal to the staff of the Kansas City NOAA National Weather Service Forecast Office, located in Pleasant Hill, Missouri. The staff was recognized with the agency's second highest award for actions taken during a significant flash flood event that occurred in Kansas City on August 27, 2004.

Flash flooding developed across much of the greater Kansas City metropolitan area during the late afternoon and evening of August 27, 2004. Rainfall totals across Wyandotte County, east into Kansas City, Missouri ranged from 6 to 8 inches. Portions of Interstate 35 were closed near Turkey Creek due to flooding. Sections of Interstate 635 and Interstate 70 were also closed for a time due to mud slides and flooding. The scope of the rain that fell was very similar to the October 4, 1998 flash flood event in Kansas City that claimed 11 lives.

However, the combined efforts of planning and mitigation from emergency managers and public works agencies across the greater Kansas City metropolitan area, along with the combination of new technology, training and enhanced communications at the National Weather Service, led to no loss of life due to flooding on August 27, 2004. ◆

2006 Severe Weather Awareness Quiz

1. The least active months for severe thunderstorms in Kansas and Missouri are:

A. July-August B. May-June

C. September-October D. December-January

2. Due to the Earth's rotation , tornadoes cannot move westward in the region.

A. True B. False

3. In Kansas and Missouri, tornadoes have never occurred in November.

A. True B. False

4. Vehicles with airbags make excellent shelters from a tornado.

A. True B. False

5. A severe thunderstorm "watch" means that severe weather is imminent at your location.

A. True B. False

6. A tornado warning and tornado watch mean the same thing.

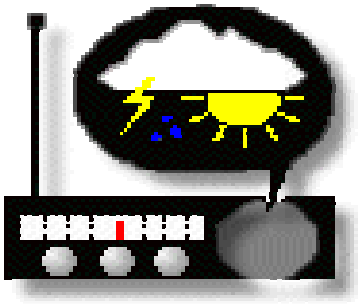
A. True B. False

7. Intense cloud to ground lightning strikes only occurs directly underneath a thunderstorm.

A. True B. False

8. If a person is playing golf and a thunderstorm develops, the person will be safe if he/she raises his/her golf club into the air acting as a lightning rod.

A. True B. False



9. During a local youth baseball game, you notice distant lightning flashes and hear low rumbles of the thunder. You should:

A. Head to the concession stand before it gets busy.

B. Get your umbrella ready in case it rains.

C. Bring it to the referees attention, and get in your car or a nearby building.

D. Stand under a tree to keep dry in case it rains.

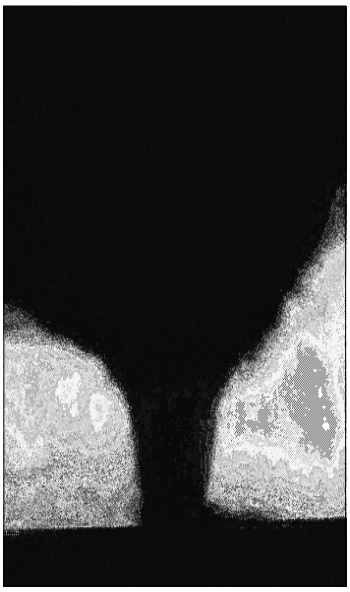
10. If you notice your hair standing straight up then you may be about to be struck by lightning.

A. True B. False

…… QUIZ ANSWERS ……

1.**D** (Dec-Jan), **2. B** (False), **3. B** (False), **4. B** (False), **5. B** (False), **6. B** (False), **7. B** (False), **8. B** (False), **9. C** (Attention and Shelter), **10. A** (True)

How does your National Weather Service deliver severe weather information?



NWS Terms you should know:

- Tornado Watch
- Tornado Warning
- Severe Thunderstorm Watch
- Severe Thunder storm Warning
- Severe Weather Statement
- Significant Weather Alert
- Flood Watch
- Flash Flood Warning
- Flash Flood Statement
- Hazardous Weather Outlook

NOAA's National Weather Service uses specific terminology to relay the weather threat to the public in the fastest way possible. Keep these products in mind as we enter the 2006 Severe Weather Season:

Tornado Watch

Means that conditions are favorable for tornadoes to develop. It is normally issued for four to six hours, and can include many counties. If you are in or near the Tornado Watch area, stay informed with NOAA Weather Radio, commercial radio, or television.

Tornado Warning

Means that a tornado has been sighted, or a developing tornado is reported by trained spotters or indicated on Doppler radar. A warning is typically issued for a small area for less than 45 minutes. If a Tornado Warning is issued for your area, take cover right away!

Severe Thunderstorm Watch

Means that conditions are favorable for thunderstorms to produce large hail or damaging winds. These watches are normally issued for four to six hours at a time, and for a large number of counties. Once again, if you are in or near the Severe Thunderstorm Watch area, stay informed.

Severe Thunderstorm Warning

Means that a severe thunderstorm has been detected by Doppler radar, or by a trained spotter. Severe thunderstorms produce wind gusts to 58 mph or stronger, or hail one inch in diameter or larger. Take cover quickly if a severe thunderstorm approaches you, or if one is reported in your area.

Severe Weather Statement

The Severe Weather Statement is a follow-up to Tornado and Severe Thunderstorm Warnings. These statements inform you of the current status of a tornado or severe thunderstorm. In addition, it gives the history of a storm, where it is moving, and who it will affect. This NWS product is also used to cancel or expire a warning.

Significant Weather Alert

A Special Weather Statement called a "Significant Weather Alert" will be issued to either address storms that are either just below severe criteria, for storms expected to produce penny or nickel size hail, or to give a heads-up for storms that are severe and are moving towards your area. The Significant Weather Alert contains important information!

Flood Watch

This is issued when heavy rain may develop and result in flooding or flash flooding in or near the watch area. A Flood Watch will also be issued if ground, river/stream conditions, or radar surveillance indicate flash flooding is possible, but not imminent within a designated area.

Flash Flood Warning

Means flash flooding has developed or is imminent in the area. When a Flash Flood Warning is issued, move to higher ground immediately!

Flash Flood Statement

Flash Flood Statements are used to continue, expire, or cancel Flash Flood Warnings. These statements provide additional or current information, to keep you informed of the flooding status.

Hazardous Weather Outlook (HWO)

This product issued by the NWS discusses the significant weather threats of the day, and also out through the next seven days. It describes potential weather hazards for an area, and is especially created for trained spotters and Emergency Managers. The HWO will detail the type of severe weather expected (if any), timing, and expected location of the severe weather. This product should be used daily as a briefing tool for severe weather potential. ◆

WIND SPEED ESTIMATE	
25-31 mph	Large branches in motion; whistling heard in telephone wires
32-38 mph	Whole trees in motion; inconvenience felt walking against the wind
39-54 mph	Twigs break off trees; wind generally impedes progress
55-72 mph	Damage to chimneys and TV antennas; pushes over shallow rooted trees
73-112 mph	Peels surfaces off roofs; windows broken light mobile homes pushed or overturned; moving cars pushed off road
113-157 mph	Roofs torn off houses; cars lifted off ground

Tornado Safety

- **IN HOMES OR SMALL BUILDINGS:** Go to the basement (if available) or to an interior room on the lowest floor, such as a closet or bathroom. Upper floors are unsafe. If there is no time to descend, go to a closet, a small room with strong walls, or an inside hallway. Wrap yourself in overcoats or blankets to protect yourself from flying debris.

- **IN SCHOOLS, HOSPITALS, FACTORIES, OR SHOPPING CENTERS:** Go to interior rooms and halls on the lowest floor. Stay away from glass-enclosed places or areas with wide-span roofs such as auditoriums and warehouses. Crouch down and cover your head. Don't take shelter in halls that open to the south or the west. Centrally-located stairwells are good shelter.

- **IN HIGH-RISE BUILDINGS:** Go to interior small rooms or halls. Stay away from exterior walls or glassy areas.

- **IN CARS OR MOBILE HOMES: ABANDON THEM IMMEDIATELY**! Most deaths occur in cars and mobile homes. If you are in either of those locations, leave them and go to a substantial structure or designated tornado shelter.

- **IF NO SUITABLE STRUCTURE IS NEARBY:** Lie flat in the nearest ditch or depression and use your hands to cover your head. Be alert for flash floods.

- **DURING A TORNADO:** Absolutely avoid buildings with large free-span roofs. Stay away from west and south walls. Remember, seek shelter on the lowest level, go to the smallest room, and center part of the building. ◆

Flood Safety

- **IF OUTDOORS:** Climb to safety if you hear or see signs of a flood, and take cover from other threatening weather as soon as possible.

- **IF CAMPING:** Be aware of your campground, and whether it is in a low lying area. Remember that flat areas may be dry streambeds, and that these streambeds may quickly flood with little warning.

- **MONITOR FLOOD WARNING INFORMATION:** NOAA All-Hazards Weather Radio is a great source to receive critical flood warning information directly from the NWS.

- **TURN AROUND, DON'T DROWN:** Most flood deaths occur at night, and in automobiles. Barricades across flooded roads are there for your protection. Drivers can lose control of their vehicles in as little as six inches of water. Two feet of water is generally enough to carry most vehicles away, including SUV's. Remember, the road bed under the water may have been scoured or even washed away during flooding, creating unsafe driving conditions.

- **IF TRAVELING TO THE EAST COAST OR GULF COAST:** Think inland flooding the next time you hear hurricane or tropical storm. Heavy rains from a land-falling tropical system can cause significant flooding well inland.

- **DEVELOP A FLOOD EMERGENCY ACTION PLAN:** Remember, floods can occur nearly everywhere and at any time of the year. Determine your flood risk and purchase flood insurance if necessary. Flood damage is not covered by homeowner's insurance. ◆

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Extreme Heat: Exposed

By Mike Hudson, Warning Coordination Meteorologist

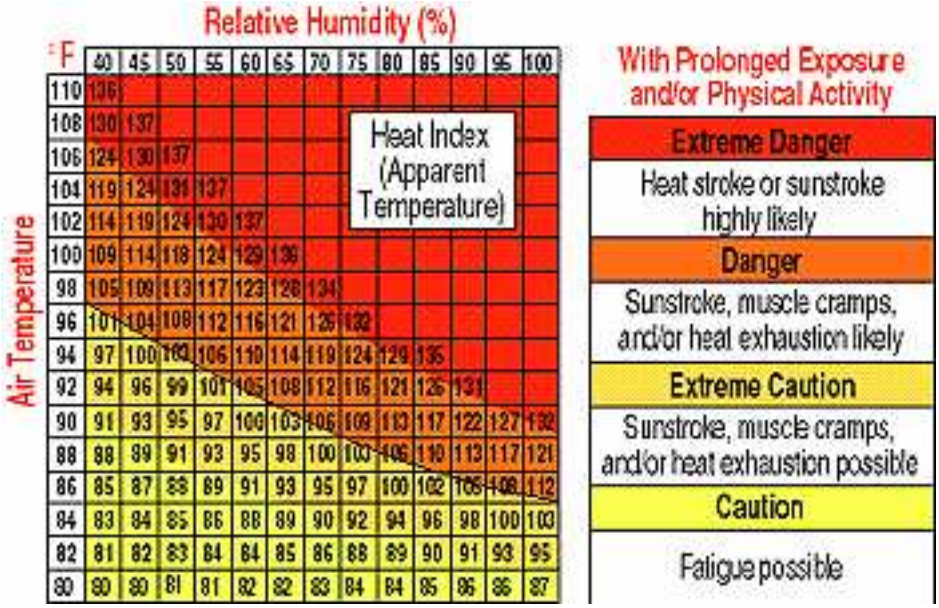
The Midwest is exposed to Mother Nature's worst each year. Temperatures in the Midwest can fluctuate to great extremes. In the summer months, temperatures commonly climb into the 90's, and when combined with extreme humidity, can create heat indices well over 100.

Tornadoes and severe thunderstorms receive the most publicity, but ***did you know that most weather related fatalities in the past few years were not associated with severe storms, but with extreme temperatures?***

On an average year in the United States, extreme heat will cause more than 175 deaths. In 2005, extreme heat claimed 8 lives in Missouri, and one life in Kansas. That number does not take into account the number of deaths that are accelerated by heat exposure.

As a means of lessening the threat, the National Weather Service issues advisories and warnings when excessive heat and humidity is expected. The NWS uses a defined "Heat Index" (HI), which is an accurate measure of how hot it really feels when the relative humidity is high. *(See diagram below.)*

Help promote heat safety during Missouri's Summer Weather Safety Awareness Week, which occurs in conjunction with the national Lightning Safety Awareness Week from June 18-24, 2006. ◆



EXCESSIVE HEAT

WARNING:

If the Heat Index (HI) equals or exceeds 115 degrees for three hours or longer, or 105 degrees for three consecutive days.

HEAT ADVISORY:

If the HI reach 105 degrees for three hours or more.

Hot terms you should know

- **HEAT WAVE:** Prolonged period of excessive heat, often combined with excessive humidity.
- **HEAT INDEX:** A number in degrees Fahrenheit (F) that tells how hot it really feels when relative humidity is added to the actual air temperature. Exposure to full sunshine can increase the heat index by 15 degrees.
- **HEAT CRAMPS:** Heat cramps are muscular pains and spasms due to heavy exertion. Although heat cramps are the least severe, they are often the first signal that the body is having trouble with the heat.
- **HEAT EXHAUSTION:** Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim's condition will worsen. Body temperature will keep rising and the victim may suffer heat stroke.
- **HEAT STROKE:** Heat stroke is life-threatening. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. ◆

Turn Around, Don't Drown!
Flash Flooding and Flood Safety

By Mike Hudson,
Warning Coordination Meteorologist

While we work and prepare the most for tornadoes, flooding also deserves plenty of attention. In the past ten years, flooding has accounted for 14 deaths and $41 million in damage in Kansas. In Missouri, flooding has resulted in 46 deaths and $147 million in property damage since 1995. These numbers compare very close to the number of tornadoes deaths (15 and 31) and tornado damage ($208 million and $136 million) across both states respectively during the same time period.

When these warnings are issued for your area, or the moment you realize that a flash flood is imminent, act quickly to save yourself. **YOU MAY ONLY HAVE SECONDS WHEN FLOODING THREATENS!**

How do flash floods occur?

Several factors contribute to flash flooding. The two key elements are rainfall intensity and duration. Intensity is the rate of rainfall, and duration is how long the rain lasts. Topography, soil conditions, and ground cover also play an important role. Most flash floods are caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same area.

When a **Flood or Flash Flood WATCH** is issued, be alert to signs of flash flooding and be ready to

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How can a foot or two of water cost you your life?

Water weighs 62.4 lbs. per cubic foot and typically flows downstream at 6 to 12 miles an hour. When a vehicle stalls in the water, the water's momentum is transferred to the car. For each foot the water rises, 500 lbs. of lateral force are applied to the car.

However, the biggest factor is buoyancy. For each foot the water rises up the side of the car, the car displaces 1,500 lbs. of water. In effect, the car weighs 1,500 lbs. less for each foot the water rises. Thus, two feet of water will carry away most automobiles.

Hail

Hail rarely kills people, but it can become a killer if precautions are not taken. In May of 1986, China experienced such intense hail that it killed 100 people, injured 9,000, and destroyed 35,000 homes.

Lightning Kills - Play it Safe!

By Mike Hudson
Warning Coordination Meteorologist

Lightning is one of nature's most awe inspiring and dangerous phenomenon. The average lightning flash could light a 100-watt light bulb for more than three months! The temperature of a lightning bolt may reach **50,000 degrees Fahrenheit** which is hotter than the surface of the sun!

On average, lightning kills one person in Kansas and Missouri each year, and about 73 nationwide. **Remember, Lightning Kills, Play it Safe!**

The safest place to be in a thunderstorm is indoors, and away from windows. Do not

remain outdoors when a thunderstorm approaches. If 30 seconds or less passes between a flash of lightning and when you hear the thunder, you are at a greater danger of being struck by lightning.

Lightning has been known to strike as many as ten miles from the parent thunderstorm. Go indoors, and wait until 30 minutes has passed since you heard the last clap of thunder before venturing back outdoors.

Lightning is a year-round threat. The National Weather Service will hold a **National Lightning Safety Awareness Week from June 18-24, 2006**.

To learn more about lightning safety, and for additional resources for promoting lightning safety in your community, check out: **www.lightningsafety.noaa.gov**. ◆

Turn Around,Don't Drown!

National Flood Safety Awareness Week March 20-24, 2006

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evacuate on a moment's notice.

When a Flash Flood **WARNING** is issued for your area, or the moment you realize that a flash flood is imminent, act quickly to save yourself. **Immediately:**

> Get out of areas subject to flooding. This includes dips, low spots and low water crossings.

> Do not attempt to walk across flowing streams. Water moving swiftly, even water 6 inches deep, can sweep you off your feet.

> Be aware that the road bed may not be intact under the water.

> Do not underestimate flood waters. Remember: **Turn Around, Don't Drown!** Go another way. NEVER drive through flooded roads or low water crossings

> Be cautious at night when flooding is hard to recognize. Also, be aware that storms that are miles away may bring raging water your way.

NOAA's National Weather Service will hold its annual **National Flood Safety Awareness week campaign March 20-24, 2006**. Each day of the week will highlight a different element of the flood awareness program:

- Monday - Advanced Hydrologic Prediction Service
- Tuesday - Turn Around Don't Drown
- Wednesday - Flooding and Related Phenomena.
- Thursday - Determining Flood Risk/Flood Insurance.
- Friday - Flood Safety

For more information on flooding check out the following web sites:

Turn Around, Don't Drown toolkit:

http://tadd.weather.gov/

National Flood Safety Awareness:

http://www.floodsafety.noaa.gov ◆

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"Working together to save lives."